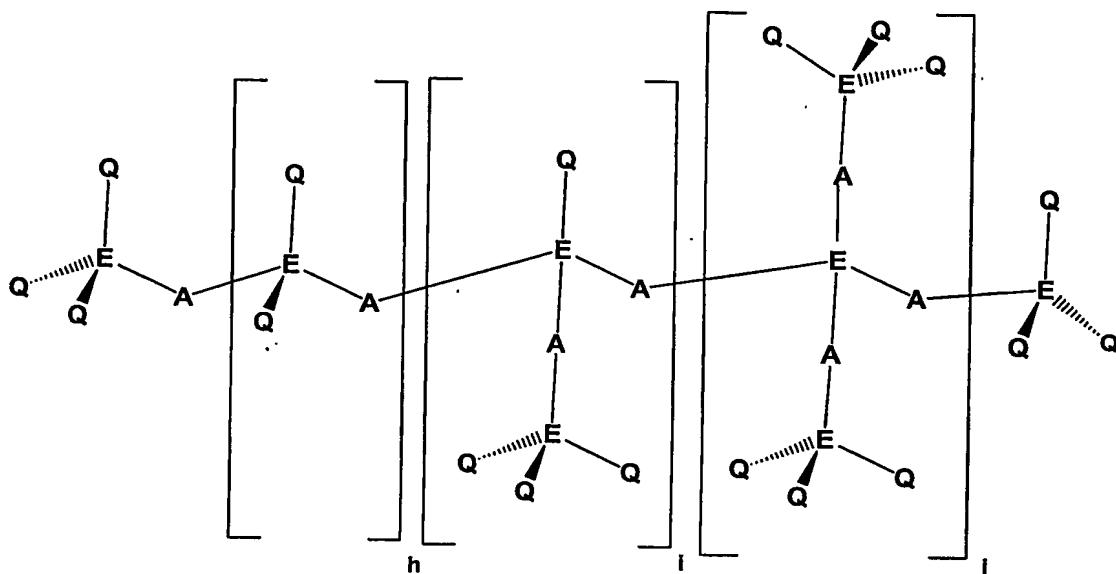


CLAIMS

We Claim:

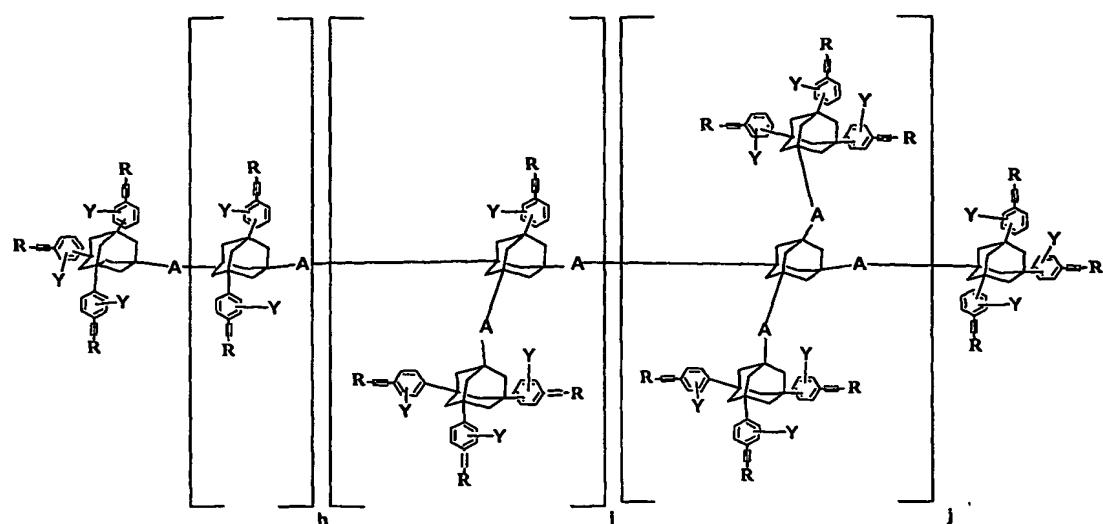
1. A composition comprising at least one oligomer or polymer of Formula I

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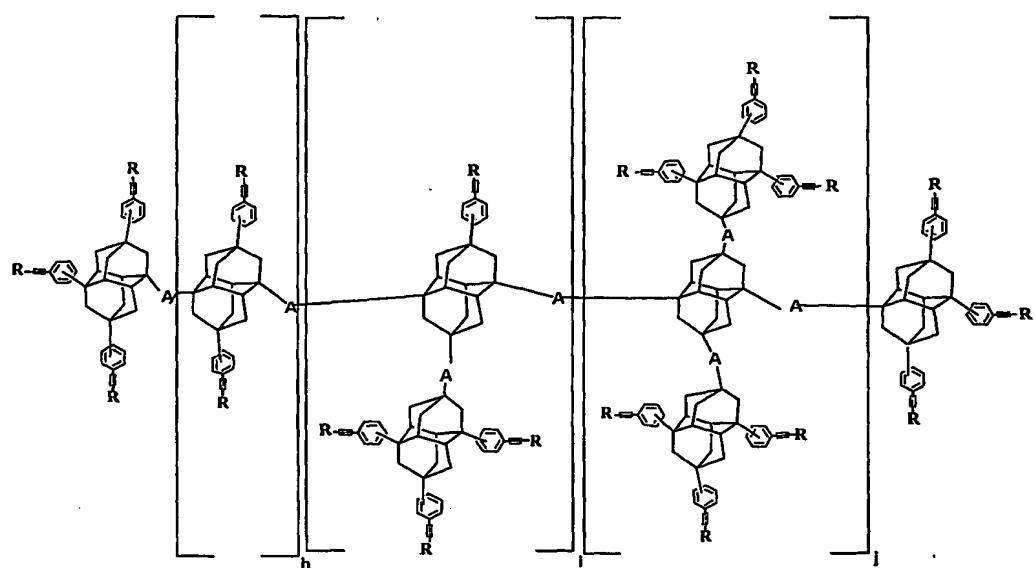


10 where E is a cage compound; Q is the same or different and selected from aryl, branched aryl, and substituted aryl wherein said substituents include hydrogen, halogen, alkyl, aryl, substituted aryl, heteroaryl, aryl ether, alkenyl, alkynyl, alkoxyl, hydroxyalkyl, hydroxyaryl, hydroxyalkenyl, hydroxyalkynyl, hydroxyl, or carboxyl; A is substituted or unsubstituted aryl with substituted or unsubstituted arylalkynyl group, wherein substituents include hydrogen, halogen, alkyl, phenyl or substituted aryl; and aryl includes phenyl, biphenyl, naphthyl, terphenyl, anthracenyl, polyphenylene, polyphenylene ether, or substituted aryl; h is from 0 to 10; i is from 0 to 10; j is from 0 to 10; and w is 0 or 1.

15  
20 2. The composition of claim 1 wherein said oligomer or polymer is adamantine of Formula II



or said oligomer or polymer is diamantane monomer of Formula III

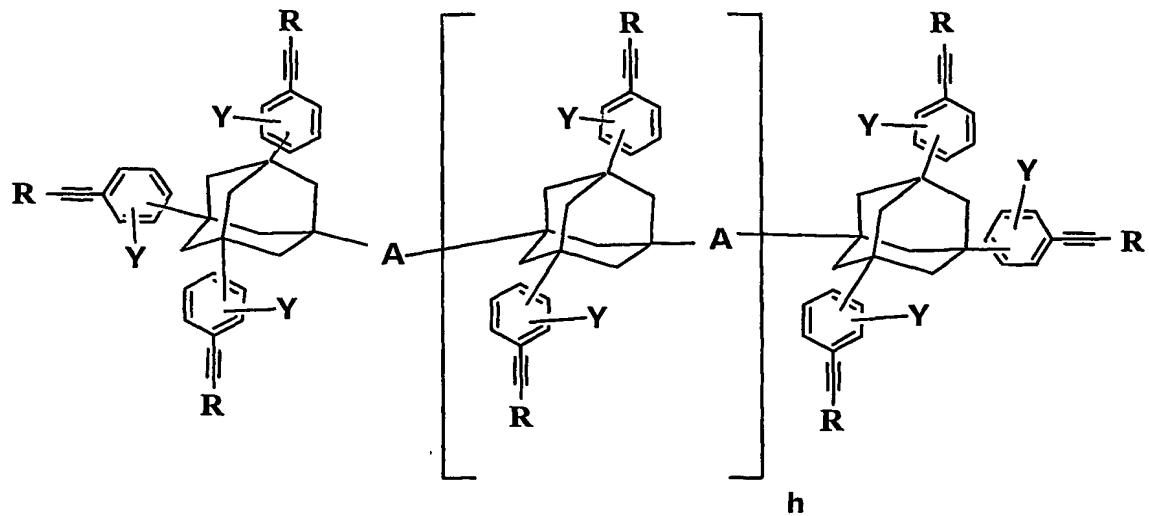


where said h is from 0 to 10; said i is from 0 to 10; said j is from 0 to 10; each of said R is the same or different and selected from hydrogen, halogen, alkyl, aryl, substituted aryl, heteroaryl, aryl ether, alkenyl, alkynyl, alkoxyl, hydroxyalkyl, hydroxyaryl, hydroxyalkenyl, hydroxyalkynyl, hydroxyl, or carboxyl; each of said Y is same or different and is selected from hydrogen, alkyl, aryl, substituted aryl, or halogen; and each of said A is substituted or unsubstituted aryl with substituted or unsubstituted arylalkynyl group, wherein substituents include hydrogen, halogen, alkyl, phenyl or substituted aryl; and aryl includes phenyl, biphenyl, naphthyl, terphenyl, anthracenyl, polyphenylene, polyphenylene ether, or substituted aryl.

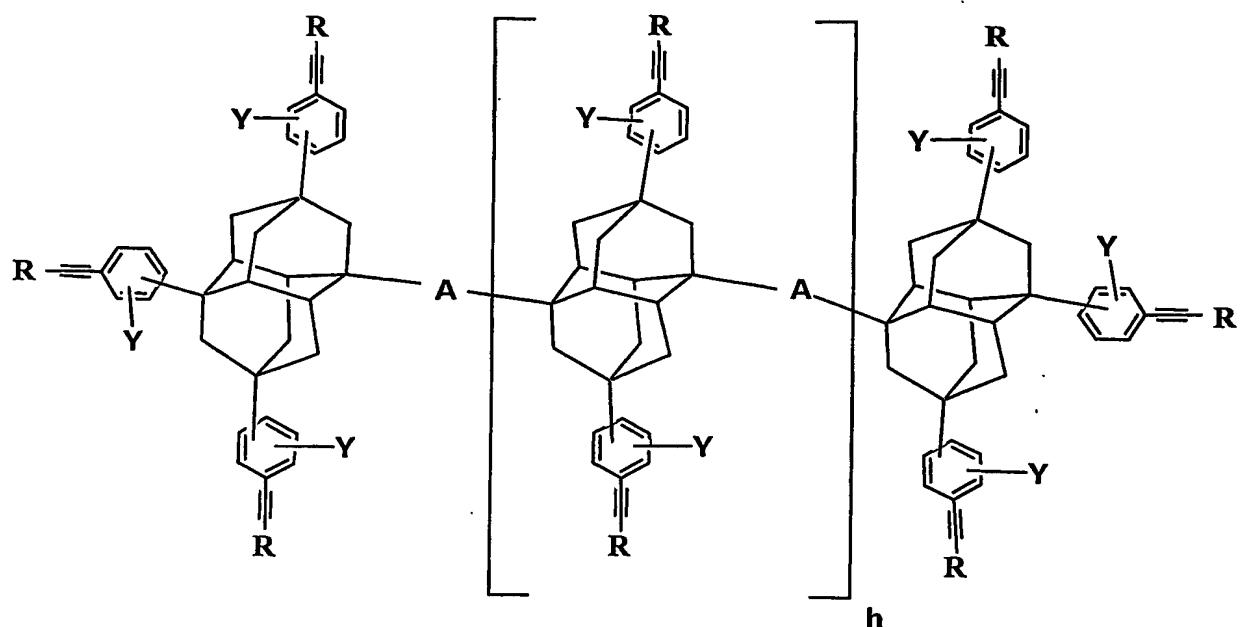
10 3. The composition of claim 2 wherein said R is phenyl.

4. The composition of claim 2 wherein said Y is hydrogen.

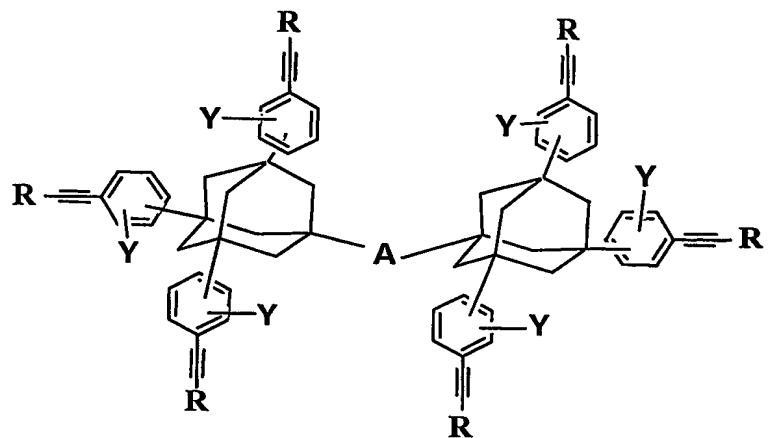
15 5. The composition of claim 2 wherein said adamantane oligomer or polymer is of Formula V where h is 0 or 1



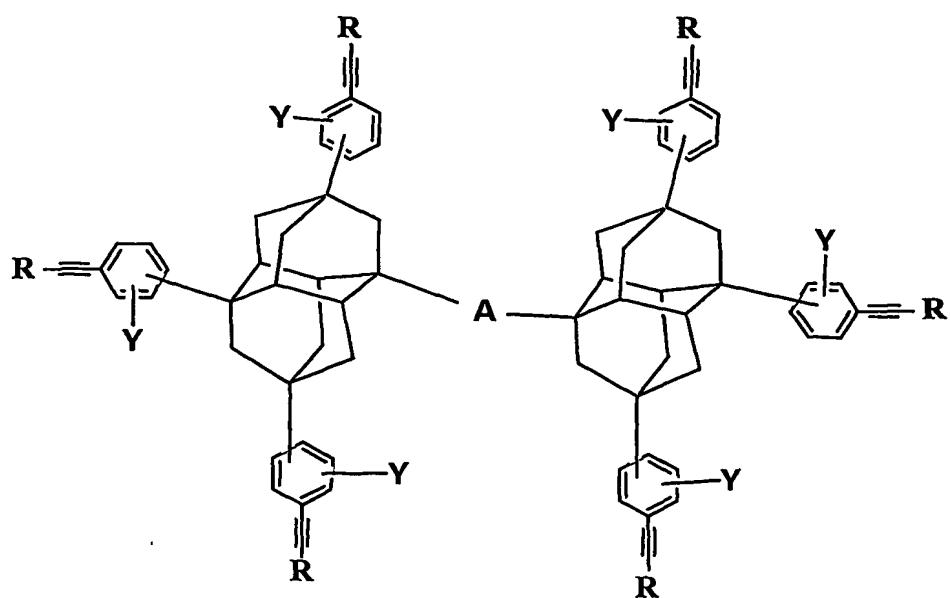
20 or said adamantane oligomer or polymer is of Formula VI where h is 0 or 1



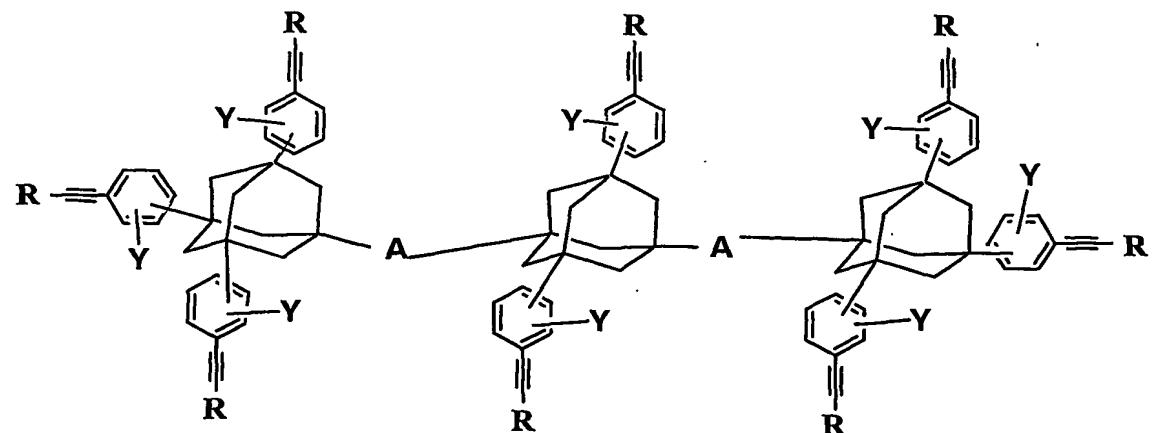
6. The composition of claim 5 wherein said adamantane oligomer or polymer is of Formula VII



or said diamantane oligomer or polymer is of Formula VIII

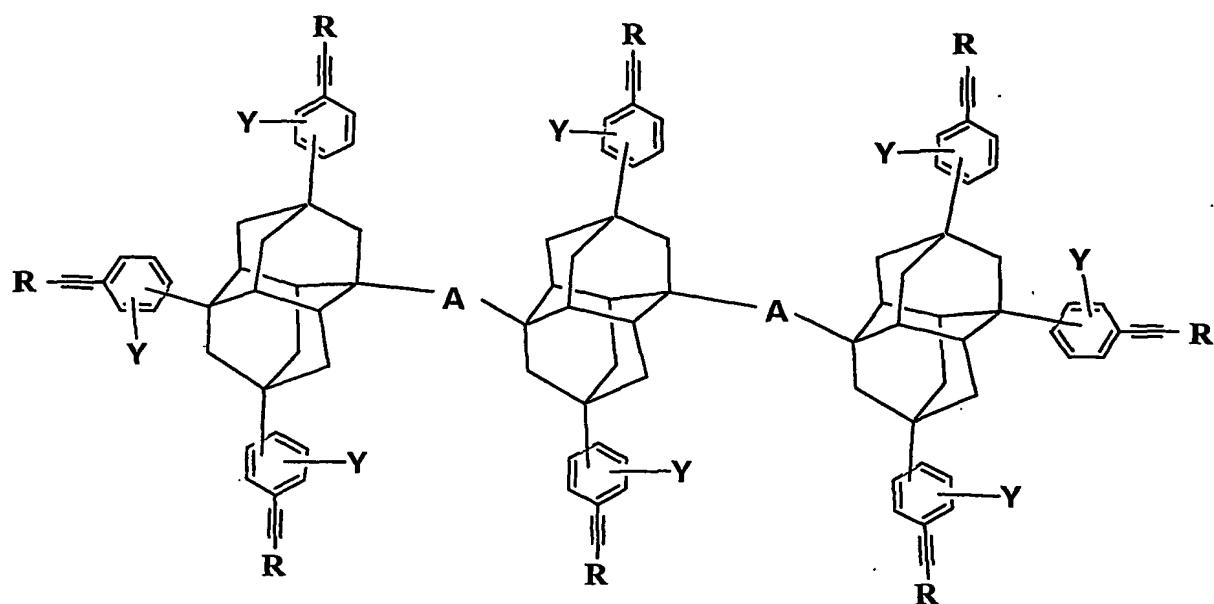


7. The composition of claim 5 wherein said adamantane oligomer or polymer is of Formula IX



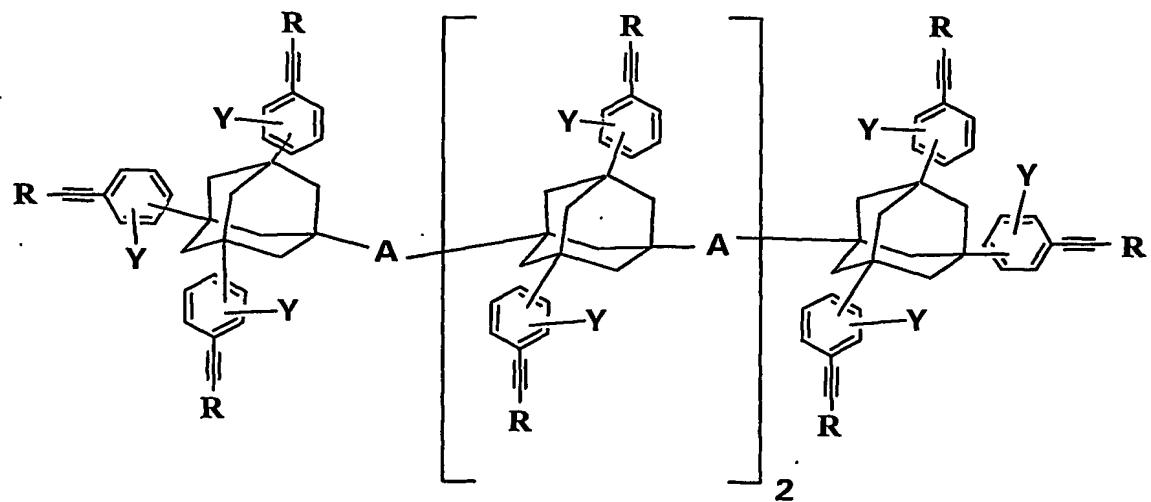
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or said diamantane oligomer or polymer is of Formula X

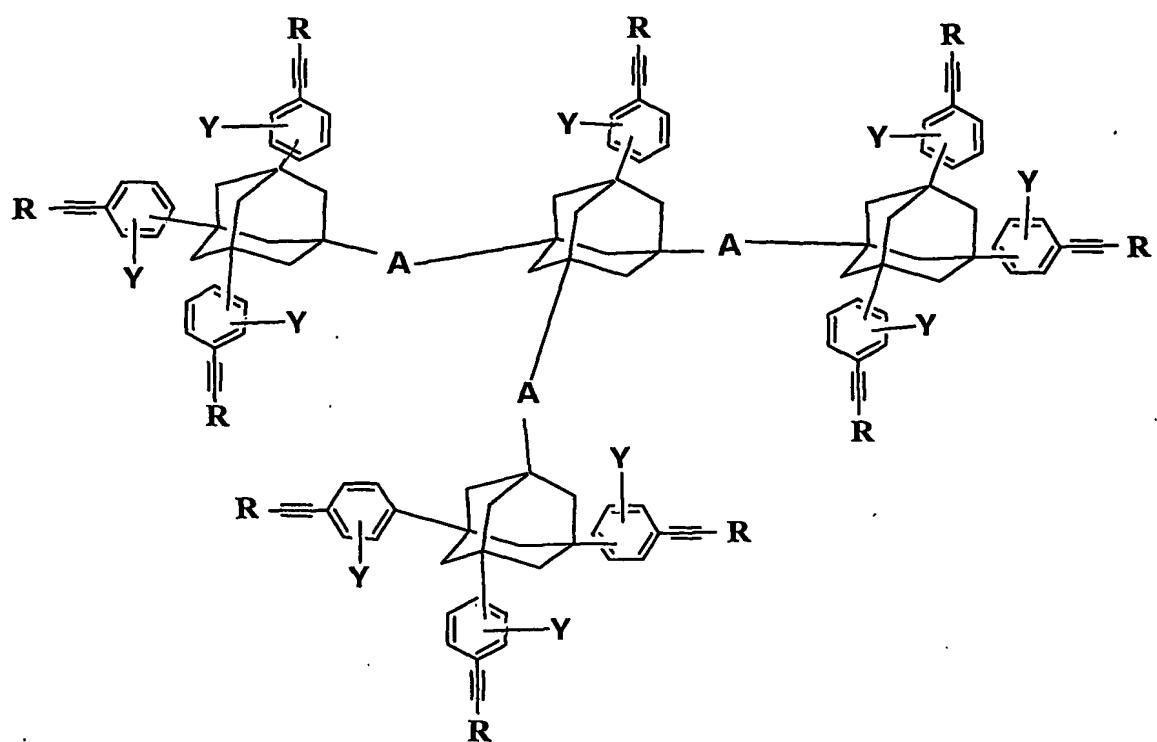


8. The composition of claim 2 wherein said adamantane oligomer or polymer is of Formula XI

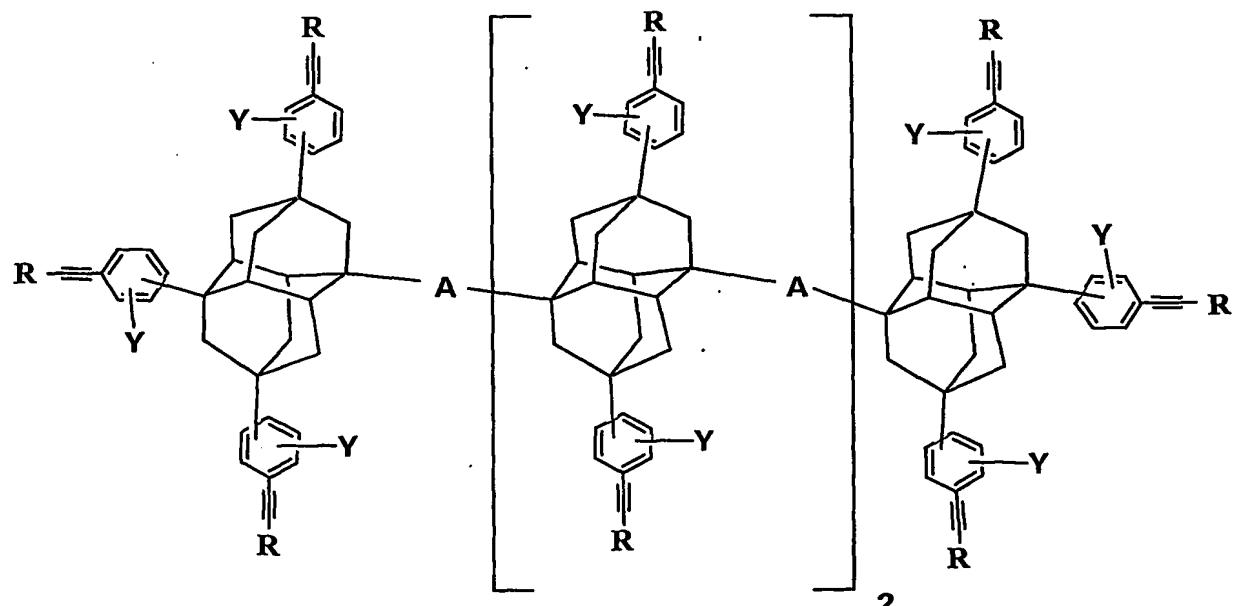
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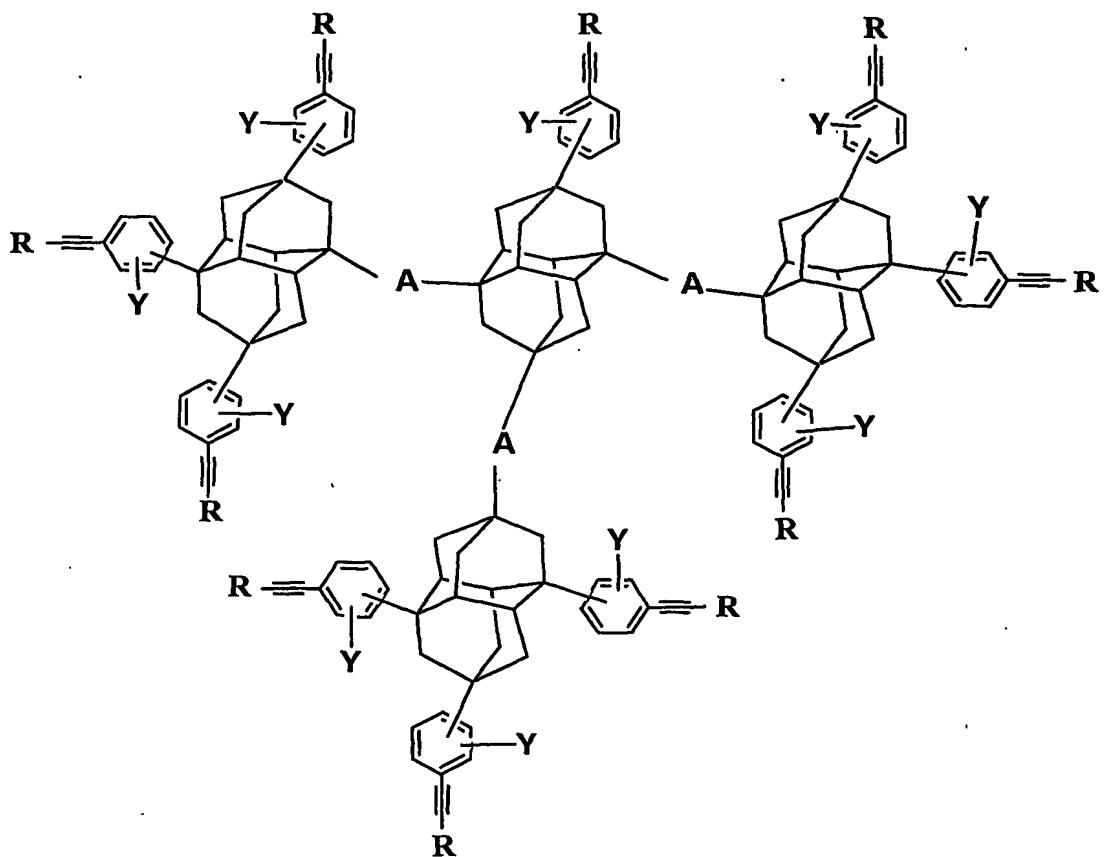
and said adamantane oligomer or polymer is of Formula XII



or said diamantane oligomer or polymer is of Formula XIII



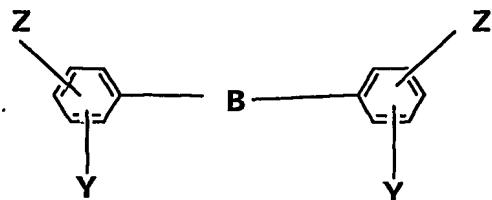
and said diamantane oligomer or polymer is of Formula XIV



9. The composition of claim 1 wherein said oligomer or polymer is adamantane based.

5 10. The composition of claim 2 wherein said oligomer or polymer is adamantane based.

11. The composition of claim 2 wherein said A is Formula IV



10

where  $B = (R_1)_m - (Ar)_n - (C \equiv C)_x$  where m is 0, 1, 2, or 3; n is 0, 1, 2, 3, or greater; x is 2, 3, 4, or 5;  $R_1$  is hydrogen, halogen, alkyl, t-butyl, phenyl, or substituted aryl; and Ar is phenyl, biphenyl, naphthyl, terphenyl, anthracenyl, polyphenylene, or polyphenylene

ether, or substituted aryl; Y is the same Y as above and Z is hydrogen, phenylethynyl, or the same as B above.

12. The composition of claim 11 wherein said B is  $(R_1)_m-(Ar)_n-(C\equiv C)_x$  where m is 0, 1, 2, 5 or 3; n is 0, 1, 2, 3, or greater; x is 2, 3, 4, or 5;  $R_1$  is hydrogen, halogen, alkyl, t-butyl, phenyl, or substituted aryl; and Ar is phenyl, biphenyl, naphthyl, terphenyl, anthracenyl, polyphenylene, polyphenylene ether, or substituted aryl.

13. The composition of claim 12 wherein said B is selected from the group consisting of 10  $m$ -diethynyl benzene;  $p$ -diethynyl benzene; diethynyl naphthalene; diethynyl biphenyl; and diethynyl phenylene oxide.

14. The composition of claim 11, further comprising adhesion promoter.

15. The composition of claim 11, further comprising porogen.

16. A spin-on composition comprising the composition of claim 2.

17. The spin-on composition of claim 16, further comprising at least one solvent.

20 18. A layer comprising the spin-on composition of claim 16.

19. The layer of claim 18, wherein the composition is cured.

25 20. A substrate having thereon the layer of claim 18.

21. A microchip comprising the substrate of claim 20.

22. A dielectric film comprising an irregular organic material having a thickness of up to 30 about 25,000 Angstroms.

23. The dielectric film of claim 22, wherein the thickness is up to about 16,000 Angstroms.

24. The dielectric film of claim 23, wherein the thickness is up to about 10,000 Angstroms.

25. The dielectric film of claim 24, wherein the thickness is up to about 5,000 Angstroms.
26. The dielectric film of claim 25, wherein the thickness is up to about 1,000 Angstroms.
- 5 27. A method of forming a coating solution, comprising:
  - providing at least one of the compositions of claims 1 or 2;
  - providing at least one solvent; and
  - combining the at least one composition and the at least one solvent to form the coating solution.
- 10 28. The method of claim 27, further comprising providing at least one adhesion promoter and combining the at least one adhesion promoter with the at least one composition and the at least one solvent.
29. The method of claim 27, further comprising providing at least one porogen and combining the at least one porogen with the at least one composition and the at least one solvent.
- 15 30. The method of claim 28, further comprising providing at least one porogen and combining the at least one porogen with the at least one composition, the at least one adhesion promoter and the at least one solvent.